

Claims:-

1. A method of forming a pattern on an article comprising the steps of:
applying a carrier material to a substrate to provide the pattern, the carrier material carrying a seeding substance to allow application of a metallic material thereto;
moulding the substrate to form the article;
and applying the metallic material to the seeding substance on the carrier material.
2. A method according to claim 1, wherein the carrier material is an ink and is applied to the substrate by printing.
3. A method according to claim 2, wherein the ink incorporates a binder material for fixing the seeding substance on the substrate.
4. A method according to claim 3, wherein the step of moulding the substrate can involve stretching some of the substrate, wherein the binder material is selected from materials capable of stretching to at least the same extent as the substrate.
5. A method according to claim 3, wherein the binder material is one or more selected from the group consisting of acrylic resins, silicone, polyurethanes, polycarbonates, polyesters, rosins, rubbers, polyimides, polyolefins, derivatives of polyolefins, polystyrenes, derivatives of polystyrenes and polymer alloys such as acrylonitrile-butadiene-styrene, acrylstyrene.
6. A method according to claim 1, wherein the seeding substance comprises a plurality of metal particles in the carrier material.
7. A method according to claim 6, wherein the step of applying the metallic material to the carrier material comprises plating the metallic material onto the metallic particles in the carrier material.

8. A method according to claim 7, wherein the step of plating the metallic material onto the carrier material comprises at least one step selected from the group consisting of electroplating and electroless plating.
9. A method according to claim 6, wherein the metal particles are present in a range of 0.005 wt% to 10 wt%.
10. A method according to claim 6, wherein the metal particles are present in a range of 0.05 wt% to 5 wt%.
11. A method according to claim 6, wherein the metal particles are present in a range of 0.1 wt% to 2 wt%.
12. A method according to claim 6, wherein the metal particles have an average size of no greater than 0.15 μm .
13. A method according to claim 6, wherein the metal particles have an average size in the range of 0.003 μm to 0.05 μm .
14. A method according to claim 6, wherein the metal particles have an average size in the range of 0.003 μm to 0.015 μm .
15. A method according to claim 1, wherein the step of moulding the substrate comprises press moulding the substrate to form the article.
16. A method according to claim 1, wherein the substrate comprises a plastic sheet.
17. A method according to claim 16 wherein the plastic sheet comprises a thermoplastic material.
18. A method according to claim 1, wherein the step of moulding the substrate is carried out before the step of applying the metallic material to the carrier material.

19. A method according to claim 1, wherein the pattern is a line pattern to define electrical connections.
20. A moulded article comprising a substrate and a pattern on the substrate, the pattern comprising a first layer of a carrier material, carrying a seeding substrate, and a second layer of a metallic material, the second layer providing electrical connections.
21. A moulded article according to claim 20, wherein the carrier material is an ink.
22. A moulded article according to claim 21, wherein the ink incorporates a binder material for fixing the sealing substance on the substrate.
23. A moulded article according to claim 22, where the substrate is capable of stretching, the binder material is selected from materials capable of stretching to at least the same extent as the substrate.
24. A moulded article according to claim 22, wherein the binder material is one or more selected from the group consisting of acrylic resins, silicone, polyurethanes, polycarbonates, polyesters, rosins, rubbers, polyimides, polyolefins, derivatives of polyolefins, polystyrenes, derivatives of polystyrenes and polymer alloys such as acrylonitrile-butadiene-styrene, acrylstyrene.
25. A moulded article according to claim 20, wherein the seeding substance comprises a plurality of metal particles in the carrier material.
26. A moulded article according to claim 25, wherein the metallic material is a plating on the metallic particles in the carrier material.
27. A moulded article according to claim 26, wherein the plating of the metallic material on the carrier material comprises at least one selected from the group consisting of an electroplating and an electroless plating.

28. A moulded article according to claim 25, wherein the metal particles are present in the carrier a range of 0.005 wt% to 10 wt%.
29. A moulded article according to claim 25, wherein the metal particles are present in a range of 0.05 wt% to 5 wt%.
30. A moulded article according to claim 25, wherein the metal particles are present in a range of 0.1 wt% to 2 wt%.
31. A moulded article according to claim 21, wherein the metal particles have an average size of no greater than 0.15 μm .
32. A moulded article according to claim 25, wherein the metal particles have an average size in the range of 0.003 μm to 0.05 μm .
33. A moulded article according to claim 25, wherein the metal particles have an average size in the range of 0.003 μm to 0.015 μm .
34. A method according to claim 20, wherein the substrate comprises a plastic sheet .
35. A method according to claim 34 wherein the plastic sheet comprises a thermoplastic material.
36. A method according to claim 20, wherein the pattern is a line pattern.
37. Apparatus for forming a pattern on an article comprising a supply assembly for supplying a substrate, a first applicator for applying a carrier material to the substrate, the carrier material carrying a seeding substance to allow application of a metallic material thereto, a moulding arrangement for moulding the substrate to form the article, and a second applicator for applying the metallic material to the seeding substance on the carrier material.

38. Apparatus according to claim 37, wherein the first applicator is a printer and the carrier material is an ink.

39. Apparatus according to claim 37, wherein the second applicator is a plating assembly for plating the metallic material onto the seeding substance.

40. Apparatus according to claim 39, wherein the plating assembly is at least one selected from the group consisting of an electroplating assembly and an electroless plating assembly.

41. Apparatus according to claim 37, wherein the moulding arrangement comprises a press moulding arrangement.